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At the San Diego County Office of Education, Alicia Gallegos Butters (left), Educational Technology Director, and Carrie Lane, Project Specialist, designed a program to teach K-12 students how to use technology for good.

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# Hands-On Projects with Innovative Technologies Connect Students and Communities

Dynamic learning experiences help illustrate the design process and encourage accessibility.

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by **Erin Brereton** ✕  
 Erin Brereton has written about technology, business and other topics for more than 50 magazines, newspapers and online publications.

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In 2024, the San Diego County Office of Education introduced a design thinking-based program that helps K-12 students build innovation, technology and other career skills by creating solutions to positively affect the community.

Participants designed a high chair, for example, to make eating food easier for cats and dogs that struggle to swallow due to an esophageal condition.

A middle school student who is visually impaired received a Braille-enabled Nintendo Switch cover, a customized football outfitted with bells and clip-on devices that allow him to play football with his classmates.

"We wanted to use tech integration in education to solve real-world problems," says Carrie Lane, a project specialist in SDCOE's Educational Technology department. "We really wanted to come up with something that would be scalable for our educators, because we work with 42 districts and 500,000 students."

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The Ed Tech for Good: Advancing Accessibility program includes three-hour labs held at SDCOE's Linda Vista Innovation Center. Students learn about the design thinking process, hear from local speakers, and use Lenovo Legion computers and 3D modeling software such as Autodesk's Tinkercad to craft an assistive design.

SDCOE also conducts three-week, onsite labs at schools that involve instruction and conferring with project recipients. Groups of two or three students select a project option, develop a prototype on their school-provided Google Chromebooks or other devices, and test and refine a 3D-printed miniature version. This can help them learn about design principles and what working in the assistive technology field requires, Lane says.

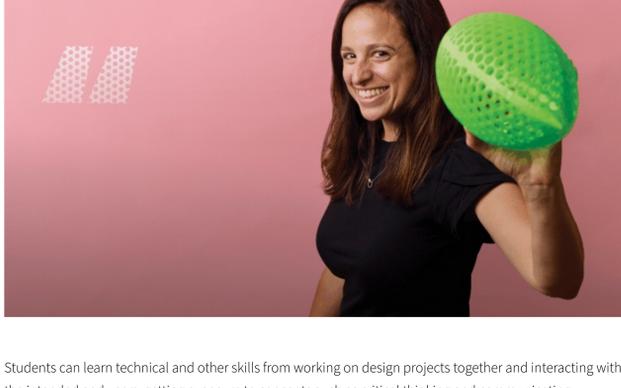
"They can see there is a career where they can be creative and help people and solve problems," she says. "A lot of them say they want to keep making these projects because it will mean something to the students or be impactful for the animals."

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## Community-Based Activities Convey More Than Core Proficiencies

To further help educators use immersive learning, Lane developed the Experience, Create, Facilitate professional development program, which showcases the method's structure and efficacy.

"We don't gatekeep this at all," says SDCOE Educational Technology Director Alicia Gallegos Butters. "She brings in teachers to participate alongside students on day one. On day two, they create the lesson plan, and then they go back to their districts and teach it. We're really trying to ensure anybody can do this with their classroom."



Students can learn technical and other skills from working on design projects together and interacting with the intended end users, getting exposure to concepts such as critical thinking and communicating effectively, according to Sabba Quidwai, founder and CEO of Designing Schools, an educational consultancy that helps leaders integrate AI and design thinking.

"When we sit down to collaborate, we have to remove ego," Quidwai says. "A lot of times, we already know what we want, but you can't be attached to your design solution. Innovation begins with empathy, not with technology, because if I don't understand the people around me, what am I creating?"

The Edgewood High School students who operate ilc Designs, one of four student-run businesses in the school's Ellettsville, Ind., district, regularly confer with clients to present potential designs and pricing quotes for customized pens, trophies and other orders.

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The design studio built the mobile cart that the Coffee Corral, Edgewood High's student-operated coffee shop, uses to sell hot chocolate at football games, and students are currently constructing a counter so the coffee shop can offer baked goods.

"We have a mission that we serve the classroom, campus and community," says Jennifer Barrett, assistant superintendent of teaching and learning at Richland-Bean Blossom Community School Corporation, which is Edgewood High's district. "One of the things ilc Designs worked on this past year was the anatomy of an eye. Our kids designed and 3D-printed a model third grade teachers could use."

Seventh and eighth graders can begin prepping to use 3D printers and other equipment in an elective class offered in the junior high's dedicated design space. It's part of the district's effort to impart technical and soft skills that area business leaders say they want graduates to possess, Barrett says.

"We know giving them experience will allow them to fine-tune what high school is going to look like for them," she says. "We put a focus on digital design and fabrication at all levels. We also have a makerspace in our primary and intermediate building for K-5 students. We start at a really young age to build those skills."

## Participatory Instruction Facilitates Engagement and Comprehension

The New England Innovation Academy — a day and boarding school for grades 6-12 — has incorporated human-centered design and experiential learning throughout its curriculum since the Marlborough, Mass., school was founded five years ago, according to Director of Innovation Greg Mertz.

In May, about 20 NEIA students explored the connection between artificial intelligence and design thinking at the Day of AI event, sponsored by the MIT Responsible AI for Social Empowerment and Education Initiative.

# 47%

The percentage of U.S. students that educators estimate use artificial intelligence for schoolwork

Source: McGraw Hill Education, "The McGraw Hill Global Education Insights Report: Challenges, Opportunities and the Future of Education in the Age of AI," April 2025

Held at the Museum of Science in Boston, the event included presentations involving AI mechanics, ethical considerations and tips for engaging citizens in their communities. NEIA's students also shared proposals for tech solutions to inspire positive change.

"All of the ideas came from students," says NEIA Industrial Designer in Residence Francisco Mireles. "Some went further — some were more conceptual. It was a good opportunity for them to apply skills they already have because we do more long-term, in-depth projects at school."

The event prompted the school to add a new elective design course, Apps for Impact, for the fall 2025 semester.

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Students can access tech options on NEIA's campus during the school year, including 3D printers from Bambu Lab and Formlabs, Meta Quest 3 virtual reality headsets, and Adobe Illustrator and Photoshop for 2D modeling.

The Hive, the academy's makerspace, isn't the domain of any single course or subject area, Mertz says. A humanities class might meet there, a graphic design instructor could issue an assignment that involves its vinyl application tools, or students may independently stop by to build a robot.

As a relatively young school, NEIA is still working to pinpoint specific factors that encourage enrollment, according to Mertz. However, providing tangible, interactive learning scenarios that align with students' interests can be key, he says.

"We help students identify what they're passionate about and then put the resources and curricular flexibility behind that so they can get hands-on experience," he says.

PHOTOGRAPH BY MATTHEW FURMAN

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